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| 10/725,870 | 12/02/2003 | Hang Li | 10541-1851 | 2760 |

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AUTOMOTIVE COMPONENTS HOLDINGS, LLC
c/o MACMILLAN SOBANSKI & TODD
One Maritime Plaza, Fourth Floor
720 Water Street
Toledo, OH 43604-1853

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| EXAMINER |
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BAREFORD, KATHERINE A

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| ART UNIT | PAPER NUMBER |
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1762

DATE MAILED: 04/12/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/725,870

Applicant(s)

LI ET AL.

Examiner

Katherine A. Bareford

Art Unit

1762

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 27 February 2006.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-13 is/are pending in the application.
- 4a) Of the above claim(s) 8-12 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,2,4-7 and 13 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Claim 3 is canceled

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

The amendment of Feb. 27, 2006 has been received and entered.

With the amendment, claim 3 is canceled, claims 8-12 are withdrawn, and new claim 13 is provided, leaving claims 1-2, 4-7 and 13 present for examination.

Election/Restrictions

1. Applicant's election of Group I, claims 1-7 and 13 in the reply filed on Feb. 27, 2006 is acknowledged. Because applicant did not distinctly and specifically point out the supposed errors in the restriction requirement, the election has been treated as an election without traverse (MPEP § 818.03(a)).
2. Claims 8-12 are withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected invention, there being no allowable generic or linking claim. Election was made **without** traverse in the reply filed on Feb. 27, 2006.

Specification

3. The amendment filed Feb. 27, 2006 is objected to under 35 U.S.C. 132(a) because it introduces new matter into the disclosure. 35 U.S.C. 132(a) states that no amendment shall introduce new matter into the disclosure of the invention. The added material which is not supported by the original disclosure is as follows:

In paragraph [0003], "NVH" has been defined as "noise, vibration, and harshness", however, applicant has not provided any support for this amendment or indication as to why this would be the understood term.

Applicant is required to cancel the new matter in the reply to this Office Action.

Claim Objections

4. Claim 7 is objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim. Applicant is required to cancel the claim(s), or amend the claim(s) to place the claim(s) in proper dependent form, or rewrite the claim(s) in independent form.

Claim 7 requires "wherein the applying includes spraying the Al-Si coating with a thermal spray process". This is already required by the last two lines of independent claim 1 as amended, and therefore, claim 7 is not further limiting.

Claim Rejections - 35 USC § 112

5. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

6. Claims 1-2, 4-7 and 13 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably

convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

(a) claim 1 has been amended to provide that the process includes "... securing an uncoated heat shield to a catalytic converter in the exhaust system of an automotive vehicle, running the engine of the vehicle; locating regions of said heat shield where high levels of vibration occur ...". However, the only support in the specification or claims as originally filed are to attaching a heat shield to a catalytic converter of muffler system of a running engine, and locating regions of said heat shield where high levels of vibration occur while the engine is running. See paragraph [0027]. That the heat shield is uncoated when secured to the heat shield, that the catalytic converter is in the exhaust system of an automotive vehicle and that the engine run is the engine of the vehicle is not supported. The engine system could be a test engine system, for example. As a result, claim 1, as amended claims new matter.

(b) claim 4 has been amended to provide that the composition of the Al-Si is measured by weight. Applicant provides that the support for this usage is in figure 2, where the Al-Si system is referenced to weight. However, in figure 2, the Al-Si system is also referenced by atomic percent (see the top of the figure). As a result, one of ordinary skill would not know if weight or atomic percent were being referred to, and therefore, to amend the range to weight percent would be new matter.

The other dependent claims do not cure the defects of the claims from which they depend.

7. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

8. Claims 1-2, 4-7 and 13 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 1, line 3, "the exhaust system" should be "an exhaust system" for proper antecedent basis.

Claim 1, line 5, "the engine" should be "an engine" for proper antecedent basis.

Claim 1, line 6, "high" is vague and indefinite as to how large vibrations need to be in order to be considered "high".

Claim 1, lines 3-7, as worded lines 3-5 provide "securing an uncoated heat shield to a catalytic converter in the exhaust system of an automotive vehicle, running the engine of the vehicle" and lines 6-7 provide "locating regions of said heat shield where high levels of vibration occur", however as worded the claim does not require the locating of lines 6-7 to occur while the running of the engine of line 5 occurs. As a result, the shield could be secured and the vehicle engine run and the shield removed and then separately tested, which does not appear to be what is intended by the claim.

Claim 1, last line, "the coating providing the vibration damping layer" has been deleted, thus removing the positive recitation that a vibration damping layer is applied

as required by the preamble of the claim. Now, what is referred to in the preamble does not necessarily have to occur.

Claim 7, line 1, "the applying" now lacks antecedent basis, as in parent claim 1, "applying a porous coating" has been changed to "thermal spraying a coating".

The other dependent claims do not cure the defects of the claims from which they depend.

Claim Rejections - 35 USC § 103

9. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

10. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

11. Claims 1-2, 4-7 and 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over the admitted state of the prior art in view of Smith (US 2355568), Hartsock et al (US 5530213), Masumoto et al (US 4859252), Kim (US 6206459) and Cremers et al (US 2002/0035456).

The admitted state of the prior art, at paragraphs [0002]-[0005], teaches that it is well known to provide catalytic converters with external heat shields made from sheet metal. The admitted state of the prior art further teaches that these shields provide a significant problem with noise, and to reduce noise it has been known to use metal liners, that are expensive to manufacture and very heavy. As a result, there is a need for an improved vibration damper for heat shields in catalytic converters.

The admitted state of the prior art teaches all the features of these claims except (1) the locating of regions of the heat shield with maximum resonance (high) vibrations and applying a coating of Al-Si to the heat shield by thermal spraying in the located regions to provide a vibration damping layer, (2) the composition of the Al-Si alloy (claims 4-5), (3) the stainless steel heat shield (claim 6), (4) the securing the heat shield to a catalytic converter in the exhaust system of an automotive vehicle and running the engine of the vehicle and locating regions, and (5) that the locating step includes identifying the regions with a laser vibration scan (claim 2) or sound pressure recording (claim 13).

Smith teaches a method for vibration damping of metal panels that can be used for forming part of a structure. Page 1, column 1, lines 1-35. Thin sheet metal panels

forming part of a structure subject to vibratory movements often vibrate in sympathy with the vibrations of the structure, leading to audible noise. Page 1, column 2, lines 5-30. Such noise can be damped with a sprayed insulation material. Page 1, column 2, lines 5-30. Smith teaches to insulate panels against vibration by applying insulation to specific, spaced areas of the panel. Page 1, column 2, line 40 through page 2, column 1, line 55. This reduces the weight of the applied material and the cost of the insulation. Page 1, column 2, line 40 through page 2, column 1, line 15. The vibrations are understood to vibrate outward from the center, and thus, insulation is applied to the center of the panel, as this is the point of maximum amplitude of vibration. Page 2, column 1, lines 10-55. Furthermore, the insulation is applied to areas outwardly from the center in a decreasingly thick manner somewhat corresponding to the decrease in amplitude of vibration which would otherwise be present. Page 2, column 1, lines 10-55. The areas of insulation can be applied in a multitude of different shapes and desires. Page 2, column 1, lines 10-55.

Hartsock teaches that in order to apply sound damping characteristics to a sheet metal manifold of stainless steel, a thermal spray coating (plasma or wire arc) can be applied. Column 2, lines 40-55 and column 3, lines 1-30. The coating can be a porous coating of stainless steel or other suitable, compatible metal material. Column 3, lines 15-30.

Masumoto teaches that a desirable metal alloy with high damping characteristics for preventing vibration and noise pollution is an aluminum-silicon alloy. Column 1,

lines 10-20. The alloy can be 0.3-30 wt% silicon, remainder aluminum. Column 1, lines 40-50. For example, the alloy can be 9 wt% silicon. Column 2, lines 65-68. Other examples, include 11 and 13 wt% silicon. Column 4, lines 25-35.

Kim teaches that it is well known to perform vibration analysis of articles using computer aided engineering. See column 1, lines 35-50. Kim shows testing of a rear body of a conventional vehicle with a rear wheel housing. Column 1, lines 10-50. Kim also refers to the vibration due to load input into the vehicle body while the body is running. Column 1, lines 10-50.

Cremers teaches that when using computer aided engineering for evaluating and optimizing the acoustic performance of structures it is important to be able to predict the acoustic radiation pattern of a vibrating structure, either from computed or measured surface vibrations (acoustic radiation prediction) and to have the ability to recover surface vibrations onto a vibrating structure from measured field sound pressure level. Paragraph [0006].

It is the Examiner's position that it is well known in the art to identify areas of specific vibration with a laser vibration scan. As applicant did not traverse this position from the last Office Action, this position is considered agreed to.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the admitted state of the prior art to locate regions of the heat shield with maximum resonance (high) vibrations and to apply a vibration damping coating to the heat shield in these areas as suggested by Smith in order to

provide a lower weight and lower cost heat shield, because the admitted state of the prior art teaches a need for vibration damped heat shields of lower weight and lower cost, and Smith teaches that when vibration damping articles made from sheet metal it is desired to apply vibration damping coating to the area of highest vibration and to other spaced areas of vibrational problems, thus providing a coating of lower weight and lower cost as compared to a coating covering the entire surface. As it is taught to provide the coating to the area of highest vibration, it would be suggested that such areas must be located before coating. It would further have been obvious to modify the admitted state of the prior art in view of Smith to further provide the vibration damping coating as a porous metal alloy coating applied by thermal spraying of a stainless steel heat shield as suggested by Hartsock in order to provide a desirable vibration damping coating, because the admitted state of the prior art in view of Smith teaches to provide a vibration damping coating to specific areas of an article such as a sheet metal heat shield, and Hartsock teaches that a thermal spray coating of porous metal alloy provides desirable vibration damping on sheet metal articles, and that such sheet metal can desirably be stainless steel. It would further have been obvious to modify the admitted state of the prior art in view of Smith and Hartsock to provide the metal alloy is Al-Si, such as Al-Si 11 or 13 wt% as suggested by Masumoto, in order to provide a desirable vibration damping, as the admitted state of the prior art in view of Smith and Hartsock teaches to provide a vibration damping coating to specific areas of an article such as a heat shield by thermal spray a porous metal alloy coating, and

Masumoto teaches that a desirable vibration damping coating can be an Al-Si alloy, such as Al-Si 11 or 13 wt%. Given the range of teaching of Masumoto, it would be expected that a desirable coating could also be about 12 wt% Si, as the range from 11-13 wt% Si is taught. It would further have been obvious to one of ordinary skill in the art at the time the invention was made to modify the admitted state of the prior art in view of Smith, Hartsock and Masumoto to perform identification of vibration regions using computer aided engineering with laser scanning or sound pressure recording of a heat shield attached to a catalytic converter in the exhaust system of an automotive vehicle while running the engine as suggested by Kim and Cremers, in order to find the desired areas for coating, because the admitted state of the prior art in view of Smith, Hartsock and Masumoto teaches to provide vibration damping coating on specific areas of an article, including of maximum (high) vibration, and Kim teaches that computer aided engineering is a well known way performing vibrational analysis of vehicle components and Cremers teaching that when performing computer aid engineering of a vibrating structure it is known to use measured vibrations including field sound pressure level (sound pressure recording), which would indicate the "field measurement" or measurement in use (that is, in a running vehicle in this case) to get desirable measurements and it is further the Examiner's position that laser scanning is another well known way of identifying vibrational regions.

Response to Arguments

12. Applicant's arguments with respect to claims 1-2, 4-7 and 13 have been considered but are moot in view of the new ground(s) of rejection.

Due to applicant's amendments, the new reference to Cremers has been provided.

Conclusion

13. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

14. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Katherine A. Bareford whose telephone number is (571)

272-1413. The examiner can normally be reached on M-F(6:00-3:30) with the First Friday Off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Timothy Meeks can be reached on (571) 272-1423. The fax phone numbers for the organization where this application or proceeding is assigned are (571) 273-8300 for regular communications and for After Final communications.

Other inquiries can be directed to the Tech Center 1700 telephone number at (571) 272-1700.

Furthermore, information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).


KATHERINE BAREFORD
PRIMARY EXAMINER